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T H E

# AMERICAN NATURALIST.

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## NOTES ON MEXICAN ANTS.

BY EDWARD NORTON.



THE insects mentioned in the following paper were forwarded to the Smithsonian Institution from Mexico by Professor Sumichrast, with notes by him upon the habits of several of the species. It is a matter of some interest to notice, that, among over twenty species, about half of which are undescribed, not one is known in the United States, while several are found in Panama and Brazil. Yet many of them live in the temperate region of Mexico!

I have added to the statements of Professor Sumichrast some recorded accounts of several of the species already described, to show how little is really known about these curious insects, and partly in the hope that some reader of this paper may also become an observer of the species around his own home, in their varied habits and occupations and labors. In the whole insect world, only the honey-bee equals the ant in its instinct and the development of reasoning powers which appear truly marvellous in such minute creatures.

Perhaps the most striking peculiarity of the ants is their social character; assembling in companies of almost countless numbers, and yet working in harmony for definite objects;

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for while they have no recognized head or guide, they all seem to devote themselves to systematic efforts for forwarding the public good. All their energies are given to this, and for this they are ready to sacrifice their lives.

The family of ants, in addition to the males and females, which are winged and generally short-lived, presents "neuters," or workers, which are wingless and live throughout the year, and perform the labor of the community. The males and females appear in the summer only. After a certain time, when they are allowed to leave the nest, the whole society teems with excitement, and only settles back into its usual course when the superfluous members fly off in swarms to seek new homes. Of those which remain, the males soon die, while the females tear off their wings, or have them torn off by the workers. Once established, the female soon lays her eggs, which are minute, but increase in size before the larvæ burst forth. These are footless grubs, which are carefully tended and fed by the workers, with a fluid previously elaborated in their stomachs. When fully grown, these larvæ assume the dormant or pupa state, some genera forming cocoons, and some not, and soon undergo the transformation into the perfect insect. These larvæ and pupæ are watched with jealous care by the workers, and are transported by them to different parts of the nest, or more or less exposed to the air according to the temperature. Before man can foresee the coming storm, the nests are securely closed, and ere the skies are fairly cleared, their labors are resumed. The bodies of other animals, the juices of plants, and even the sap secretions of other insects, such as Aphides, or Plant-lice, are taken by them for the nourishment of their helpless charges.

The workers often present two distinct forms, now called the major and minor workers, in addition to which a third set of workers is often found in one nest, which are evidently of another species, but have been captured when larvæ by the stronger species, and bred and enslaved for this purpose.

On this point but little is recorded as yet in this country,\* but we have abundant testimony from observers of European species.

The major workers are usually of large size, and have the head greatly developed, but are comparatively few in number. Their duties in the society are not clearly understood, but they are supposed to have some kind of superintendence over the rest.

In the following descriptions I have thought best only to mention one or more of the prominent external characteristics by which the genera of the species here mentioned may be known.†

#### SUBFAMILY FORMICIDÆ.

In the genus *Formica*, the node, or knot-like segment between the thorax and abdomen, forms a smooth, oval or globular mass, and there is no sting.

*Formica esuriens* Smith. "This is very common in Orizaba and Cordova. It lives in great numbers in dead trees, in which it tunnels galleries, or under stones." From its form this should be grouped with our large black *Formica Pennsylvanica*, which lives in dead trees. It is not by any means certain that the species living in dead wood perforates that which is living. It seems much more likely that it occupies the channels already opened by the grubs of various borers, and helps to complete the work partly done for it. In this region the worker remains in a torpid state

\*See Mr. J. A. Allen's "Notice of a Foray of a Colony of *Formica sanguinea* Latreille, upon a Colony of the black species of *Formica*, for the purpose of making Slaves of the latter." Proceedings of the Essex Institute, Vol. V, p. 14, 1896.

†The Ant-family, *Formicidæ*, has been separated into three subdivisions, having the following prominent external characteristics:—

*Formicidæ*.—The first segment of the abdomen forming a single node. (See Fig. 3 a, showing the spinose node of *Polyrhachis*.) Not provided with a sting.

*Poneridæ*.—The first segment of the abdomen with one node. Provided with a sting.

*Myrmicidæ*.—The first segment of the abdomen with two nodes. Provided with a sting. From this last, two more subfamilies have been separated,—the *Attidæ*, the major workers of which have enormously developed heads, and the *Cryptoceridæ*, the heads of which are flattened, so that the expanded sides wholly or partly conceal the eyes. They are stingless.

in decaying wood in midwinter. Dr. Fitch has described a smaller species (*Formica Caryæ*) which inhabits hickory trees, boring its passages, as he thinks, in the living wood. The wood on the sides of these passages is much discolored and softened, probably by an acrid fluid (formic acid) emitted for that purpose by the insects.

*Formica fulvacea*. (Fig. 1, worker major.) "Taken in Cordova, where, in the woods, it ordinarily makes its nests in the middle branches of Bromeliaceous parasites."

*Formica nitida*. "Inhabits the mountains of Orizaba, where it lives in little companies under the bark of pines."

*Formica nacerda*. "Orizaba and Cordova. Found upon leaves of plants."

*Tapinoma*. In this genus the node is usually received into a depression at the base of the abdomen proper, so that at first sight it often seems to be entirely wanting.

*Tapinoma piceata*. "Potrero (near Cordova.) In the wood of oaks."

*Tapinoma tomentosa*. (Fig. 2, worker; the antennæ imperfect.) "Orizaba. In little societies under stones."

*Polyrhachis*. This genus has the node of the peduncle thickened and usually spinose (whence the generic name from the Greek, meaning *many-pointed*), having two, three, or four spines. The thorax is usually more or less armed with spines or hooks.

*Polyrhachis arboricola*. (Fig. 3, worker, 3 a, side view of thorax and abdomen.) "Mexico. Indigenous in the hot region, where it is very common. Its nest is ordinarily placed in the cracks or apertures of large trees. It often chooses the abandoned nests (*Comejens*) of the White Ants, or Termites. (In these *Comejens*, which are often very large, sometimes dwells a little species of Paroquet, the *Conurus Aztec* Somm.) It is quite vagabond in its habits, and one sees it running around on the trunks of all sorts of trees and leaves of shrubs, which strongly proves it to be essentially a tree inhabitant. It causes no trouble on plantations."

## SUBFAMILY PONERIDÆ.

*Ponera*. This genus, which is allied to the "Driver Ant" of the west coast of Africa, is known by having the node of the peduncle thickened, nodiform, with the first segment of the abdomen more or less constricted. In the anterior wings there are one marginal, two complete submerged, and one discoidal cell. All the tibial spurs of the tibiæ are pectinate, or comb-like.

*Ponera strigata*. "Temperate region of Mexico, under stones."

*Ponera pedunculata* Smith. One worker was received from Mexico. This species has previously occurred at Panama and at Rio.

*Ectatomma*. This genus is known by the thickened node of the peduncle, and the deep constriction between the first and second segments of the abdomen. The antennæ are inserted low down at the base of the clypeus; the eyes are placed above the middle of the face, while the spurs of only the anterior tibiæ are pectinate.

*Ectatomma ferruginea*. (Fig. 4, 4a, side view of peduncle of the abdomen.) "Mexico. This species is only found in the *encinales*, or oak forests of the hot and temperate region, where it lives in little societies under the trunks of fallen trees." The male differs very greatly in its antennæ and the form of the thorax from the worker. Mr. Smith has noted and figured several such cases. But this species seems peculiar in the division of the metathorax.

## SUBFAMILY MYRMICIDÆ.

In the genus *Eciton*, the peduncle consists of two nodes. The males and females are unknown. Both kinds of workers have very minute eyes, which are absent in some species. In several species the major workers have very long mandibles curved at the end, but without teeth.

*Eciton hamata* Fabr. "Rio Atoyai, near Cordova." This is also found in Brazil and Cayenne. The two kinds of

workers in this and the succeeding species have been previously described.

*Eciton Mexicana* Roger. (Fig. 5, worker major, 5 a, front view of head showing the immense sickle-like mandibles, and only the two basal joints of the antennæ. Fig. 6, worker minor, with a front view of the head, showing the mandibles of the usual size.) "Cordova, Orizaba, etc."

*Eciton brunnea*. "Occurs at Cordova, Orizaba, etc."

*Eciton Sumichrasti*. (Fig. 7.) "Cordova, Orizaba, etc. All the researches that I have made up to this time to discover the *formicarium* of the *Eciton*, have been fruitless, and I cannot obtain any information from the natives where these insects are common. At one time only (May, 1865) I found under a fallen trunk a prodigious number of workers of *E. Mexicana*. They were heaped and piled upon each other like the bees in a swarm. Attacking them with the end of a stick, I obliged them to disperse, but could find no entrance which they concealed, no eggs, no males nor females.

"Especially before a storm, or after a stormy rain, one meets travelling bands of *Eciton*. Their march is generally conducted in excellent order, and with a file of one or two individuals in front. Sometimes, however, the column enlarges itself, scatters and attacks with fury the passer-by, who, by ill-luck, has disturbed the procession. The *E. Mexicana* especially seems naturally very irascible, and the entomologist who wishes to enrich his collection with specimens of this species, must take his time and protect his legs from an attack.

"I only find the individuals with long mandibles (those which Smith calls *major workers*) among the *E. hamata* and *E. Mexicana*. It is difficult to satisfy oneself as to the role which they fill in the community. I have watched with attention the passage of columns of *Eciton*, but could see nothing to indicate any peculiar attributes to these individuals.

"The *Eciton* does no harm to agriculture by depriving the

trees of their leaves, like the *Cecodoma*. On the contrary, it destroys, probably, a host of noxious insects, and so recommends itself to planters; while it merits the attention of entomologists by the singularity of its habits, and the obscurity which yet reigns about its history."

In relation to the duties of these major workers with long mandibles, Mr. Bates writes (British Museum Catalogue of Hymenoptera, Vol. VI, p. 149) of a South American species: "I am quite convinced that these large-headed ones are a distinct order of individuals in a colony of Ecitons, and fulfil some distinct, peculiar functions." "I once saw on a beach a dense column of Ecitons descending from the rocks on one side of the harbor, traversing the beach and climbing again on the opposite side; the length of the column visible was from sixty to seventy yards, and yet there was no appearance of the van or the rear of the army. It was probably a migration, as all the small-headed individuals carried in their mandibles a cluster of white maggots, probably larvæ of their own species." "The large-headed individuals were in proportion of perhaps about five in one hundred to the small individuals, but not one of them carried anything in its mandibles. They were all trotting along outside of the column, and distributed in regular proportion throughout the whole line, their globular white heads rendering them quite conspicuous among the rest, bobbing up and down as they traversed the inequalities of the road."

All of the Ecitons seem to prey upon living objects. It seems probable that animal food is converted into nourishment for their larvæ by comminution, as in other species is the case with vegetable matter. Mr. Bates observes "that with most species observation is a difficult matter, for no human endurance can sustain their overwhelming attacks, the cruel sting and bite of these formidable insects." They generally march in columns. One South American species, the *E. prædator*, hunts in dense masses. "The entire phalanx, when passing over a tract of open ground, occupies



a space of from six to ten square yards ; where they pass, all the rest of the insect world is in commotion and alarm. They stream along the ground and climb to the summit of all the lower trees, searching every leaf to its apex." They are often seen with the larvæ and eggs and remains of other ants, doubtless the result of attacks upon their nests. Their own nests have never yet been discovered.

In one case he thus chronicles the result of his examination of *E. legionis*. One evening he discovered a column of them at work. The next day he found them again not far off. They were mining in a bank of light soil, and extracting therefrom a bulky species of *Formica*, with their larvæ and eggs. It was curious to see them crowding around the orifices of the mines, and assisting their comrades to lift out the bodies of the luckless ants ; the latter being too bulky to carry were torn to pieces, and the marauders forthwith started off laden with their booty. "For some distance there were many lines of these moving along the declivity of the bank, but at a short distance these converged. I then traced them to a large and indurated and ancient termitarium ; up the ascent of these the *Ecitons* were moving in a dense column, like a stream of liquid metal ; many were now lugging up the bodies of the *Formicæ*, and the whole disappeared in one of the spacious tubular cavities, which always traverse these old termitaria from the summit to the base."

*Pachycondyla*. In this genus the node of the peduncle is thickened, cubical, or nearly so, elevated to the same level as the first segment, and usually of nearly the same width. The eyes are small and inserted low down upon the head. The spurs of only the two anterior tibiæ are pectinate. (Mr. Smith says all are pectinate.)

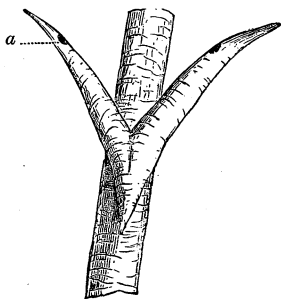
*Pachycondyla Orizabana*. "It lives at Orizaba in little societies under stones and trunks of trees."

*Pseudomyrma*. In this genus the first node is elongate, pedunculate, the second large and globose. The antennæ are inserted near together and near the mouth ; eyes elongate,

ovate, occupying a large portion of the head. Anterior wings with one marginal and three submarginal cells.

*Pseudomyrma bicolor* Guérin. (Fig. 8. The hind legs not represented, the specimen being imperfect.) "Mexico. This is also found in Columbia and at Panama."

*Pseudomyrma flavidula* Smith. Mexico. This is also a South American species. I cannot feel quite sure that it is *P. flavidula*. "Among the quite numerous species of *Pseudomyrma* that one finds in Mexico, one class appears to be solitary (at least, one never meets them except alone) while the others (as is the case in *P. bicolor* and *P. flavidula*) live in greater or less numbers within the spines which arm the stems of certain species of *Mimosa*. These spines, fixed in pairs upon the branches, are pierced near their extremity by a hole (seen in the cut at *a*), which serves for the entrance and exit of the ants. The interior is hollow and includes some neuters, the larvæ, and, in the season, males and females. The *Pseudomyrma* generally stings very sharply, and attaches itself with tenacity by its mandibles to the part of the body which it seizes. Although this differs a little in size, one of these species may be considered to be the *P. flavidula* Smith."



Mr. Smith has described a species from Panama (*P. modesta*), "which lives in the hollow thorns or spines of a species of *Acacia*. The spines are three inches long, tapering to a point from a broad base; the ants gnaw a small hole toward the point of the spine, the broad base then forms an admirable domicile for their young brood. There are no cells or divisions of any kind for the reception of the eggs or larva. The number of pupæ found in one nest was twenty-nine, and there were about twenty mature ants. All of these were workers. The pupæ were not inclosed in cocoons."

*Pseudomyrma thoracica*. "Cordova. In the trunks and under the bark of trees, in societies which are sometimes very numerous."

Two other species of *Pseudomyrma* from South America have been observed by Mr. Bates, *P. oculata* and *P. termitaria*, which construct their dwellings in chambers in the outer walls of the tunnels of different species of Termites, or white ants. Still another species, with small colonies, constructs its formicarium in the pith-tube of dried twigs. From this variety of habits there would seem to be no definite rule laid down for the genus, as in *Formica* and *Myrmica*. Each species or group of species must be studied separately, although the whole genus may meet on common ground, as to its manner of procuring food and mode of transformations.

The genus *Atta* has two nodes in the peduncle. The wings are larger than the body, with one marginal and three submarginal cells, the third sometimes incomplete, the second bell-shaped. The large workers have greatly developed heads, and the corslet, or thorax, is without spines. This genus belongs to the subfamily Attidæ of Mr. Smith.

*Atta clypeata* Smith. (British Museum Catalogue of Hymenoptera, Vol. VI, p. 169.) Mr. Smith describes only the male and female. The worker minor from Orizaba, Mexico, agrees tolerably well with the description.

Another genus of this group is *Ecodoma*. It differs from *Atta* externally, in having the corslet armed with spines, and in the fore wings are two submarginal cells, the second being incomplete.

*Ecodoma Mexicana* Smith. (Fig. 9, female; 10, worker major.) (British Museum Catalogue of Hymenoptera, Vol. VI, p. 185.) "This species is unfortunately too abundant in Mexico, in the temperate departments of the gulf coast, such as those of Orizaba, Cordova, etc. The neuters are known in Mexico under the name of *arrieras*, or *hormigas arrieras*, from the similarity presented by their marching

columns to a caravan of muleteers. The male and female bear the name of *Ticatanas*. In many places the natives eat the abdomen of the females after having detached the thorax.

"It is specially in the argillaceous countries that the *Ecodomas* build their enormous formicaries, so that one perceives them from afar by the projection which they form above the level of the soil, as well as by the absence of vegetation in their immediate neighborhood. These nests occupy a surface of many square metres,\* and their depth varies from one to two metres. Very many openings of a diameter of about one to three inches are contrived from the exterior, and conduct to the inner cavities which serve as store-houses for the eggs and larvæ. The central part of the nest forms a sort of funnel, designed for the drainage of water, from which, in a country where the periodical rains are often abundant, they could hardly escape without being entirely submerged, if they did not provide for it some outlet.

"The system which reigns in the interior of these formicaries is extreme. The collection of vegetable debris brought in by the workers is at times considerable. But it is deposited there in such a manner as not to cause any inconvenience to the inhabitants, nor impede their circulation. It is mostly leaves which are brought in from without, and it is the almost exclusive choice of this kind of vegetation which makes the *Ecodoma* a veritable scourge to agriculture. At each step and in almost every place in the elevated woods as in the plains, in desert places as well as in the neighborhood of habitations, one meets numerous columns of these insects, occupied with an admirable zeal in the transportation of leaves. It seems even that the great law of *the division of labor* is not ignored by these little creatures, judging from the following observations which I have often had occasion to make.

"The ground at the foot of the tree, where a troop of these

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\* A metre is about thirty-nine (39.37) inches.

*arrieras* is assembled for despoiling it of its leaves, is ordinarily strewn with fragments cut off with the greatest precision. And if the tree is not too lofty, one can satisfy himself that a party of foragers, which have climbed the tree, occupies itself wholly in the labor of *cutting them off*, while at the foot are the *carriers* which make the journeys between the tree and the nest. This management, which indicates among these insects a rare degree of intelligence, is perhaps not a constant and invariable practice, but it is an incontestible fact, and one which can be constantly proved.

"The part of the inhabitants which may be called the *workers*, is composed of wingless individuals of quite variable size. The largest (*workers mayores* of Smith) are distinguished from the others at first sight by the great enlargement of the head, and the presence of a single ocellus upon the face. Some travellers have attributed to these *grosses-têtes*, a superior share of intelligence, and represent them as exercising a kind of surveillance over the other members of the community. I avow that I cannot come to a like conclusion, for I have always seen them devote themselves to the same labors of cutting off and transporting the leaves, etc., and this without indicating a higher development of instinct in any way. Probably their special role, if they have one, is borne in the excavation of the nest and in tunnelling the galleries, labors which demand a superior strength and better implements.

"The nest of *Æcodoma* serves as a habitation for many parasitic lodgers: some serpents, and particularly certain insects, which there undergo their metamorphoses. In digging up their nests in the spring, one never fails to find there some large species of Scarabæides. One also very often sees a great number of males of a wasp, *Elis costalis* Lep.,\*

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\*Perhaps, and it is an interesting question which I have not yet had an opportunity to solve, the females of *Elis* deposit their eggs in the bodies of the larvæ of Scarabæus. At Tehuacan (Dep't of Puebla) where the *Scolia Azteca* Sauss. is very common, it is particularly abundant in the leather tanneries, which leads me to think that the females of this species also deposit their eggs under the epidermis of the larvæ which abound

flying about these nests, and resting themselves upon the dead branches which happen to be there, thus, I feel well assured, awaiting the coming forth from these of the females of their species which have entered into the formicary.

"At the commencement of the rainy season, after the first storms of the season, the *Ecodoma* begins the work of reproduction. The union of the sexes probably takes place during the night, for in the morning one finds the neighborhood of the formicary strewn with the dead bodies of the males and the females, the latter already fertile, from whom the workers make it their duty to tear away their wings.

"The ravages committed by the *Ecodoma*\* in inhabited places, both by the surface which their nest removes from cultivation; and by the number of trees which they despoil of their leaves, are at times considerable, and demand very great watchfulness on the part of the cultivators. They have essayed a thousand ways to put an end to the havoc which these cause. The only mode which offers a sure chance of success is the removal, the extraction of the whole nest. For this purpose they dig a trench of sufficient depth around the whole, then carry away the dome or hillock and the walls of the nest, until, arriving at the cells of the larvæ, they destroy them and also the eggs. The perfect insects which escape the ruin of their colony then disappear never to return.

"The coffee plantations, which demand a light soil, are frequently chosen by the *hormigas arrieras* as places in which to construct their nests; and one can easily imagine the loss which they cause to the proprietors, if these last do not con-

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in the tan. [The *Scarabæus* is a large insect allied to our June beetle. *Scolia* is a wasp allied to *Elis*; neither have been supposed hitherto to be parasitic insects. Their habits thus probably ally them with the *Ichneumon* fly.—EDS.]

\*"At least the *Ec. Mexicana*, for the *Ec. hystrix*, which also I have found isolated in the forests of the hot region, is too rare to be named as doing any damage." It may be well to add that Orizaba is in the temperate, Cordova between the temperate and hot, and Tehuacan in the cold regions or zones of Mexico. Mr. Bates remarks of the *Ec. hystrix* that he once "found a vast number in a low meadow, carrying away fragments of fallen fruit, but none of the large-headed individuals. This was in Brazil."

tinue an active and daily surveillance over the manœuvres of these insects."

It seems desirable to add the testimony of Mr. Bates as to the *Æc. cephalotes*, the common species of South America. "This insect, from its ubiquity, immense numbers, eternal industry, and its plundering propensities, becomes one of the most important animals of Brazil. Its immense hosts are unceasingly occupied in defoliating trees, and those most relished by them are precisely the useful and cultivated kinds. They have regular divisions of laborers, numbers mounting the trees and cutting off the leaves in irregularly rounded pieces the size of a shilling, another relay carrying them off as they fall." "The heavily laden fellows, as they came trooping in, all deposited their load in a heap close to the mound. About the mound itself were a vast number of workers of a smaller size. The very large-headed ones were not engaged in leaf-cutting, nor seen in the processions, but were only to be seen on disturbing the nest." Mr. Bates says, "I found, after removing a little of the surface, three burrows, each about an inch in diameter; half a foot downward, all three united in one tubular burrow about four inches in diameter. To the bottom of this I could not reach when I probed with a stick to the depth of four or five feet. This tube was perfectly smooth and covered with a vast number of workers of much smaller size than those occupied in conveying the leaves; they were unmixed with any of a larger size. Afterwards, on probing lower into the burrow, up came, one by one, several gigantic fellows, out of all proportion larger than the largest of those outside, and which I could not have supposed to belong to the same species. Besides the greatly enlarged size of the head, etc., they have an ocellus in the middle of the forehead; this latter feature, added to their startling appearance from the cavernous depths of the formicarium, gave them quite a Cyclopean character."

Of another species, the *Æc. sexdentata*, Mr. Smith quotes

from Rev. Hamlet Clark, that at Constancia, Brazil, the proprietor of a plantation used every means to exterminate it and failed. "Sometimes in a single night it will strip an orange or lemon tree of its leaves; a ditch of water around his garden, which quite keeps out all other ants, is of no use. This species carries a mine under its bed without any difficulty. Indeed, I have been assured again and again by sensible men, that it has undermined, in its progress through the country, the great river Pariaba. At any rate, without anything like a natural or artificial bridge, it appears on the other side and continues its course." This testimony is confirmed by Mr. Lincecum (Proceedings of Academy of Natural Sciences, Philadelphia, 1867, p. 24) in an interesting account of the *Æc. Texana*, which he has observed for eighteen years. He states that they often carry their subterranean roads for several hundred yards in grassy districts, where the grass would prove an impediment to their progress. On one occasion, to secure access to a gentleman's garden, where they were cutting the vegetables to pieces, they tunneled beneath a creek which was at that place fifteen or twenty feet deep, and from bank to bank about thirty feet. He also observes that the smaller workers which remain around the nest do not seem to join in cutting or carrying the leaves, but are occupied with bringing out the sand, and generally work in a lazy way, very differently from the quick, active leaf-cutters. Also that the pieces of leaves are usually dried outside before being carried in, and that if wet by a sudden shower are left to decay without. He also thinks that their lives are dependent upon access to water, and that they always choose places where it is accessible by digging wells. In one case, a well was dug by Mr. Pearson for his own use, and water found at the depth of thirty feet. The ant-well which he followed was twelve inches in diameter.

The genus *Cryptocerus* belongs to another subfamily, *Cryptoceridæ*, founded on the form of the head, which is



more or less flattened above, with the sides expanded into flattened marginal plates, concealing or partly hiding the eyes. The peduncle consists of two nodes, the corslet is spinose, and the face is grooved in front for the reception of the antennæ.

*Cryptocerus laminatus* Smith. (Journal of Entomology, 1860, p. 77.) Brazil. "This species lives at Cordova, in the same places as the next, but it is rarer and more solitary."

*Cryptocerus multispinosus*. (Fig. 11.) This is the most common species of *Cryptocerus* in the environs of Cordova, where it lives in the trunk of certain trees, especially those of the *Croton sanguiferum*, *Cedrela odorata*, *Spondias chilies*,\* etc. These ants show little vivacity, remaining stationary a good part of the day at the entrance of the holes which conduct to their nest. In the middle of the day one sees them running about fallen trunks, without apparent order or aim. When one attempts to seize them, they elevate the abdomen while running, after the manner ascribed to another kind of ant, the *Crematogaster Montezumia*.

NOTE.—The new species mentioned in this paper will soon be described in the Proceedings of the Essex Institute.

#### EXPLANATION OF PLATE II.

- Fig. 1. *Formica fulvacea*, worker major.  
 Fig. 2. *Tapinoma tomentosa*, worker.  
 Fig. 3. *Polyrhachis arboricola*, worker; a, side view of thorax and abdomen.  
 Fig. 4. *Ectatomma ferruginea*, worker; a, side view of the peduncle of the abdomen.  
 Fig. 5. *Eciton Mexicana*, worker major; a, front view of the head.  
 Fig. 6. *Eciton Mexicana*, worker minor, with a front view of the head.  
 Fig. 7. *Eciton Sumichrasti*, worker minor.  
 Fig. 8. *Pseudomyrma bicolor*, worker.  
 Fig. 9. *Ecodoma Mexicana*, female.  
 Fig. 10. *Ecodoma Mexicana*, worker major.  
 Fig. 11. *Cryptocerus multispinosus*, worker.

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\*These are local names for Mexican plants.

Fig. 1.

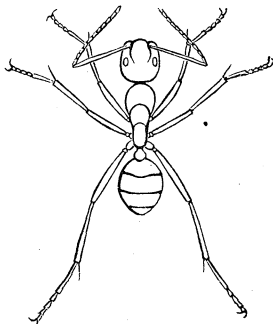


Fig. 2.

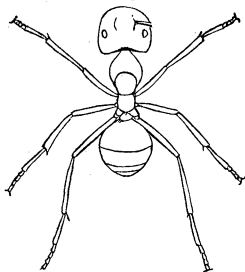


Fig. 3.

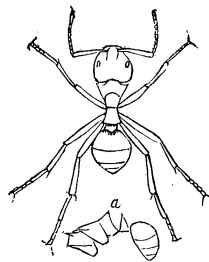


Fig. 7.

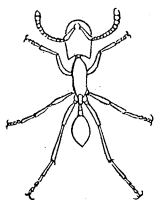


Fig. 9.

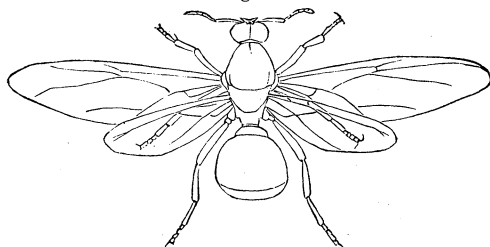


Fig. 11.

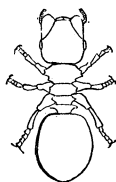


Fig. 6.

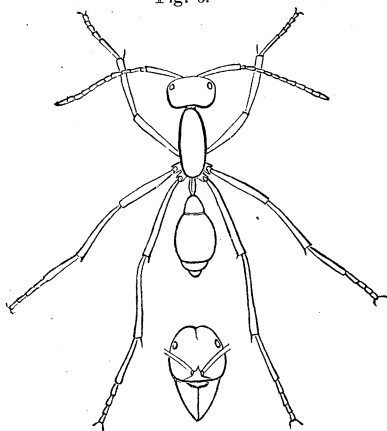


Fig. 8.

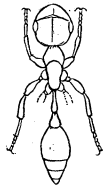


Fig. 10.

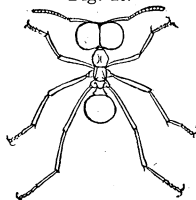


Fig. 4.

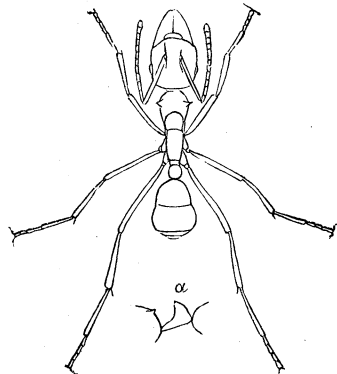


Fig. 5.

